

## Recommendations of the Biogenetic Engineering Expert Panel

On February 20, we met to advise the Department of State on potential developments in, and foreign policy implications of, genetic engineering over the next two decades. We concluded that genetic engineering will be one of the most significant scientific breakthroughs during this administration's term of office. During the next two decades, these developments will have an impact on a par with that of unleashing the atom, escaping the earth's gravity, and developing artificial intelligence. Genetic engineering holds the promise of revolutionizing agriculture, health and industry, and offers the U.S. the opportunity for commercial and scientific leadership if appropriate steps are taken now. Listed below are our findings and recommendations. A more detailed summary of the meeting is provided separately.

- Top priority: we must preserve germplasm on an international scale to protect against crop pathogens and loss of genetic diversity.
  
- To enhance commercial competitiveness and demonstrate U.S. leadership abroad, we need to restore emphasis on the basic plant sciences, industrial and medical microbiology and parasitology. We must train new people and provide financial support over longer periods of time than the usual 3-5 years of competitive grants.

- The U.S. should encourage broad exchanges, both to and from the U.S., with scientists from developed and developing countries.
- We must be ready for, and encourage, massive advances in waste recycling technologies and pollution reduction, in energy conserving fashions.
- We must develop international standards for patent protection, safety and liability. The latter is especially important due to the increasing potential for large-scale release of micro-organisms into the environment.
- We need to focus attention on and develop expertise in crops that are important to other countries, especially tropical. Opportunities exist for trade and for increasing food production in developing countries.
- While the impact of biomass on world energy supply is uncertain, we will be able to use biotechnologies to replace some energy-intensive technologies (e.g., improving fermentation to increase gasohol production; recovering more oil in situ).
- Serious pathogens with military potential already exist; genetic engineering will not make any that are worse. But new technologies could be used to destroy or reduce crop production or increase terrorist threats. At the same time, our capability to protect against biological warfare

is increasing. With the ability to protect a selected populace against a biological agent also comes the ability to use that agent against others.

- To improve U.S. competitiveness with other developed countries (especially Japan and the FRG), we need to provide a depreciation allowance for industrial research and a larger allowance for industry-university collaborative research.
- New technologies will allow us to conquer parasitic and infectious diseases cost-effectively. It would have tremendous foreign policy value if the U.S. were to launch a program to eradicate these scourges worldwide.
- New antibiotics and monoclonal antibodies (which will allow specifically targeted treatment as for cancer) also will improve human health in both the developing and developed world. The resulting increase in longevity and added impetus to population growth generates the need to develop and disseminate new contraceptive technologies.
- We must adopt flexible regulations to ensure that over-regulation does not make us non-competitive with other countries. We must also encourage other countries to observe our health and safety standards. Preserving a rational environment is crucial.

ATTENDEES FOR THE GENETIC ENGINEERING PANEL MEETING

Panelists:

Jean Mayer  
Winston Brill  
William Rutter  
Howard Schneiderman  
Frank Young

Panelists in absentia:

David Baltimore  
Joshua Lederberg  
Maxine Singer

OES Personnel:

Thomas Pickering  
James Malone  
Ann Hollick  
Margaret Gould  
George Kovach  
David McClintock  
Bill Walsh

AAAS Personnel:

William Carey  
Richard Scribner

Other Agency Observers:

OTA - Zsolt Harsanyi  
NIH - Bernard Talbot  
FDA - Henry Miller  
USDA - John Fulkerson  
Patent Office - Stan Schlosser  
NSF - Norman Cohn or Delill Nasser  
AID - Howard Minners and Lloyd Frederick

Other State Observers:

S/P - Joel Johnson  
PM - Leslie Brown